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12-9-2020

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Citation

Neubauer, Laura; Gopalani, Radhan; de Almeida, Kristen; and Marr-Peralto, Andrea, "Impact of ketorolac on opioid consumption after open heart surgery" (2020). *All Publications*. 3761.

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Impact of ketorolac on opioid consumption after open heart surgery



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BACKGROUND

- Opioids are the most common analgesics used in the postoperative period despite their potentially serious side effects^{1,2}
- The use of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) after open heart surgery for adjunctive pain control is controversial given the potential risks of acute kidney injury (AKI) with these agents
- Despite the FDA contraindication for use in patients immediately following coronary artery bypass graft (CABG) surgery, NSAIDs are commonly used in this setting with one study showing ketorolac being the agent prescribed in 90% of cases¹
- According to the current Baptist Health post open heart order set, ketorolac use is not recommended in patients with active bleeding, Scr >1.6 mg/dL, > 80yo, or recent history of GI bleed

PURPOSE

To evaluate the use of ketorolac in the immediate 48 hours after cardiac surgery at Baptist Hospital of Miami and South Miami Hospital

METHODS

Study Design: Multicenter, retrospective quality improvement project

Inclusion Criteria:

- Adults ≥ 18 years of age
- Underwent open heart surgery (CABG, valvular replacement, CABG/valvular surgery, aortic surgery) performed between 1/1/2020 and 3/31/2020

Exclusion Criteria:

- Pregnant at time of hospitalization

Primary Outcome:

- Opioid consumption in morphine milligram equivalents (MME) within 48 hours after open heart surgery

Secondary Outcomes:

- Incidence of AKI within 48 hours after open heart surgery (\uparrow in Scr ≥ 0.3 mg/dL in 48 hours)
- Opioid-induced adverse drug reactions (ADRs)

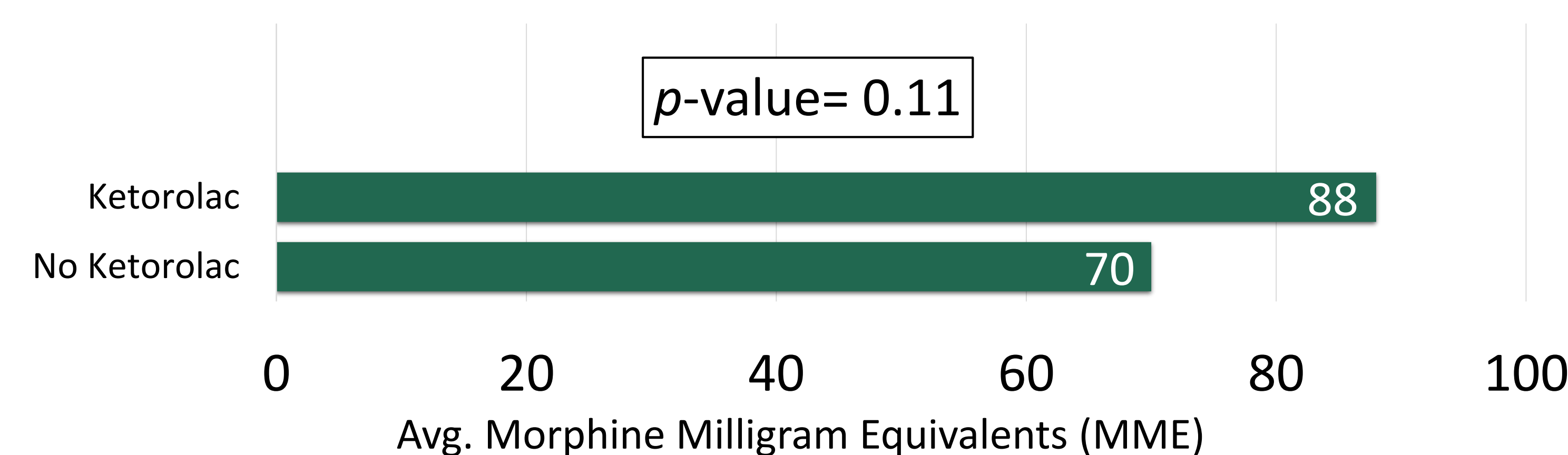
Controlling for Confounding Factors

- To control for selection bias, patients with baseline CKD and those who received fentanyl (IV push or infusion) during the immediate 48 hours postoperatively were removed from the final analysis

RESULTS

Demographics	Ketorolac (n=22)	No Ketorolac (n=45)	P-value
Avg. age, years (SD)	63.2 \pm 9.2	68.4 \pm 9.0	< 0.05
Age ≥ 75 years – n (%)	2 (9)	11 (24.4)	0.20
Gender – male, n (%)	18 (81.8)	33 (73.3)	0.55
Outpatient use of opioids – n (%)	1 (4.5)	1 (2.2)	0.55
Outpatient use of adjuvant pain meds – n (%)	2 (9)	4 (8.9)	1.00
Non-Elective Procedure – n (%)	16 (73)	28 (62)	0.40
Avg. Scr on admission, mg/dL (SD)	0.99 \pm 0.23	1.04 \pm 0.32	0.50
Avg. Scr day of surgery, mg/dL (SD)	0.90 \pm 0.16	0.98 \pm 0.28	0.21
Avg. Scr 48h postop, mg/dL (SD)	0.92 \pm 0.19	1.18 \pm 0.53	< 0.05
OTHER RISK FACTORS FOR AKI			
Use of CPB – n (%)	20 (90.9)	39 (86.7)	0.62
Dehydration postop (BUN:Scr > 20:1) – n (%)	12 (54.5)	28 (62.2)	0.55
Use of vasopressors postop – n (%)	19 (86.4)	32 (71.1)	0.17

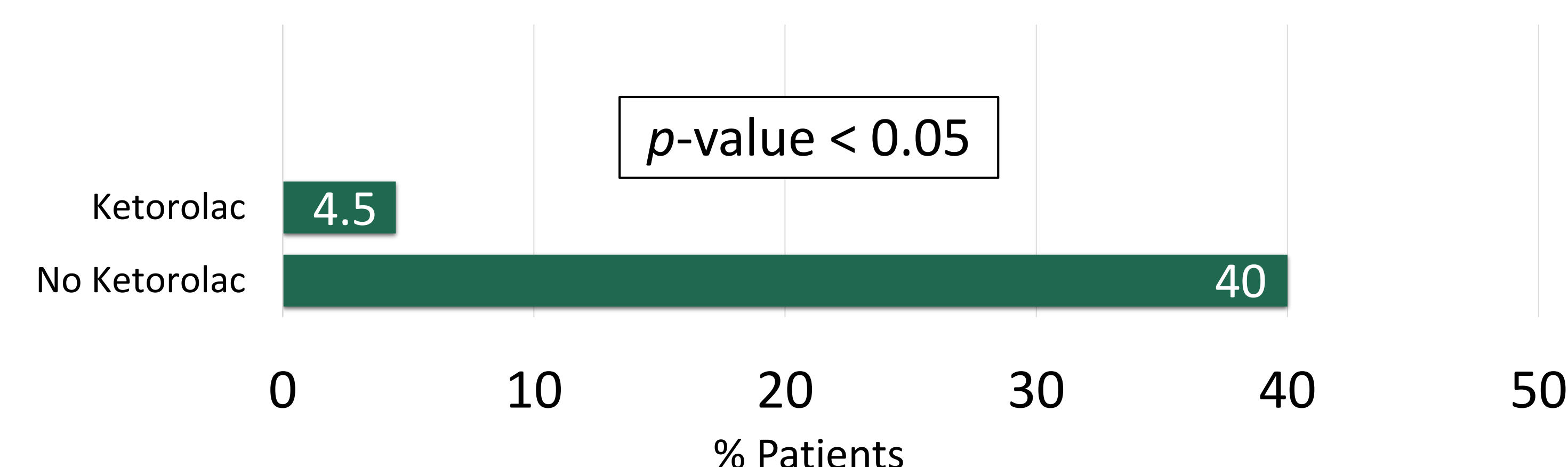
OPIOID CONSUMPTION WITHIN 48 HOURS POSTOP



ANALGESICS RECEIVED WITHIN 48 HOURS POSTOP

Analgesic – n (%)	Ketorolac (n=22)	No Ketorolac (n=45)
Morphine	22 (100)	41 (91.1)
Acetaminophen IV	21 (95.5)	41 (91.1)
Oxycodone/Acetaminophen	19 (86.4)	37 (82.2)
Acetaminophen PO	5 (22.7)	15 (33.3)
Hydromorphone	0	4 (8.9)
Gabapentin	0	3 (6.7)
Tramadol	1 (4.5)	1 (2.2)

POSTOP INCIDENCE OF AKI



CONCLUSIONS

- Baseline demographics were not statistically different between cohorts except for age ($p < 0.05$)
- There was no statistical difference in opioid consumption between cohorts ($p = 0.11$)
- Morphine and oxycodone/acetaminophen were the most commonly received opioids. Acetaminophen IV was the most commonly received non-opioid analgesic
- Patients who did not receive ketorolac had a significantly higher rate of postoperative AKI ($p < 0.05$), possibly due to the significantly older population in this cohort; other risk factors for AKI were similar between cohorts
- Use of ketorolac per the recommendations in the Baptist Health open heart order set may have additionally contributed to selection bias
- A total of 3 opioid-induced ADRs resulting in treatment discontinuation were reported (hallucinations, slight over-sedation, and nausea/vomiting)

LIMITATIONS

- Retrospective
- Small study duration and sample size
- Selection bias
- Pain scores could not be evaluated due to inconsistent documentation

DISCUSSION

- Use of ketorolac in the immediate postoperative period did not impact opioid consumption
- Risk of postoperative AKI did not increase with ketorolac
 - Observed statistically significant difference in AKI is not clinically meaningful and is likely due to the patient population under review

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DISCLOSURES

All authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have direct or indirect interest in the subject matter of this presentation.